

CLAIMS

What is claimed is:

1. A drive apparatus of an ink jet printer, including a frame, in which a sheet of paper stacked in a paper feed cassette is picked up by a pickup roller, conveyed by a convey roller and a pinch roller, and then printed by a printer head while being line-fed by the feed roller, the drive apparatus comprising:

a first gear train, disposed on a feed roller shaft having the feed roller assembled thereto, to swing within a predetermined angle around the feed roller shaft in a feed roller shaft rotation direction;

a second gear train, disposed on the frame of the ink jet printer, to be in contact with the first gear train;

a third gear train, with a front end gear connected with a rear end gear of the second gear train and a rear end gear coaxially disposed on a convey roller shaft having the convey roller assembled thereto, the third gear train swinging within a predetermined angle around a front end gear shaft, having the front end gear assembled thereto in a feed roller rotation direction; and

a control unit controlling the first gear train and the second gear train to separate from each other by the entrance of the paper into the feed roller so that the driving power is blocked to the convey roller.

2. The drive apparatus of an ink jet printer according to claim 1, wherein the first gear train comprises:

a first swing arm with one end rotatably assembled on the feed roller shaft and another end provided with a protruding second gear shaft;

a first gear integrally assembled on the feed roller shaft to rotate together with the feed roller shaft; and

a second gear engaged with the first gear and rotatably assembled on the second gear shaft.

3. The drive apparatus of an ink jet printer according to claim 2, wherein a friction member is disposed between a side of the second gear and the first swing arm.

4. The drive apparatus of an ink jet printer according to claim 3, wherein the friction member uses a compression spring or a curve spring.

5. The drive apparatus of an ink jet printer according to claim 1, wherein the second gear train comprises:

a third gear rotatably assembled on a third gear shaft protruding on the frame and engaged with the rear end gear of the first gear train; and

a fourth gear disposed to rotate in engagement with the third gear.

6. The drive apparatus of an ink jet printer according to claim 1, wherein the third gear train comprises:

a second swing arm with one end rotatably assembled on the convey roller shaft with the convey roller assembled and another end provided with a protruding fifth gear shaft;

a sixth gear integrally assembled on the convey roller shaft to rotate together; and

a fifth gear assembled to rotate on the fifth gear shaft and be engaged with the sixth gear and receiving a rotation force from the rear end gear of the second gear train.

7. The drive apparatus of an ink jet printer according to claim 6, wherein a friction member is disposed between a side of the sixth gear and the second swing arm.

8. The drive apparatus of an ink jet printer according to claim 6, further comprising a seventh gear engaged with the rear end gear of the third gear train when the convey roller comes in contact with the pinch roller thereby conveying the sheet of paper to the feed roller.

9. The drive apparatus of an ink jet printer according to claim 8, wherein a friction member is disposed on a side of the seventh gear.

10. The drive apparatus of an ink jet printer according to claim 1, wherein the third gear train comprises:

a plurality of supporting arms rotatably supporting both ends of a convey roller shaft of the convey roller;

an extension shaft connecting the plurality of supporting arms;

a front end gear rotatably assembled at one end of the extension shaft and

engaged with the rear end gear of the second gear train; and
a rear end gear integrally assembled on the convey roller shaft to rotate together.

11. A drive apparatus of an ink jet printer in which a sheet of paper stacked in a paper feed cassette is picked up by a pickup roller, conveyed by a convey roller and a pinch roller, and then printed by a printer head while being line-fed by the feed roller, the drive apparatus comprising:

- a motor;
 - a reduction gear to reduce speed of the motor;
 - a feed gear disposed at one side of a feed roller shaft with the feed roller assembled and engaged with the reduction gear;
 - a plurality of first gear trains disposed on both sides of the feed roller shaft, the plurality of first gear trains swinging within a predetermined angle around the feed roller shaft in a feed roller shaft rotation direction;
 - a plurality of second gear trains engaged with a rear end gear of the plurality of first gear trains to transmit a rotation force of the feed roller shaft;
 - a plurality of third gear trains, including a front end gear, with one end connected with a rear end gear of the plurality of second gear trains and another end coaxially connected with a convey roller shaft with the convey roller assembled, the plurality of third gear trains swinging within a predetermined angle on a front end gear shaft with the front end gear assembled in a feed roller rotation direction;
 - a pickup shaft integrally assembled on a front end gear of the plurality of the second gear train to rotate together; and
 - a pickup roller unit with one end assembled on the pickup shaft and the other end pressing upper surface of sheets of paper stacked in the paper feed cassette,
- wherein when the feed roller rotates in a direction in which the sheet of paper is conveyed to the printer head, the first gear trains separate off the second gear trains thereby preventing the pickup roller unit from rotating, and the convey roller coaxially connected with the front end gear of the third gear trains pivots downward on the front end gear shaft of the third gear trains thereby being separated off the pinch roller.

12. The drive apparatus of an ink jet printer according to claim 11, wherein at least one of the first gear trains comprises:

a first swing arm with one end rotatably assembled on the feed roller shaft and another end provided with a protruding second gear shaft;

a first gear integrally assembled on the feed roller shaft to rotate together with the feed roller shaft; and

a second gear engaged with the first gear and rotatably assembled on the second gear shaft.

13. The drive apparatus of an ink jet printer according to claim 12, wherein a friction member is disposed between a side of the second gear and the first swing arm.

14. The drive apparatus of an ink jet printer according to claim 13, wherein the friction member uses a compression spring or a curve spring.

15. The drive apparatus of an ink jet printer according to claim 11, wherein at least one of the second gear trains comprises:

a third gear rotatably assembled on a third gear shaft protruding on the frame and engaged with the rear end gear of one of the first gear trains; and

a fourth gear disposed to rotate in engagement with the third gear.

16. The drive apparatus of an ink jet printer according to claim 11, wherein at least one of the third gear trains comprises:

a second swing arm with one end rotatably assembled on the convey roller shaft with the convey roller assembled and another end provided with a protruding fifth gear shaft;

a sixth gear integrally assembled on the convey roller shaft to rotate together; and

a fifth gear assembled to rotate on the fifth gear shaft and be engaged with the sixth gear and receiving a rotation force from the rear end gear of the second gear train.

17. The drive apparatus of an ink jet printer according to claim 16, wherein a friction member is disposed between a side of the sixth gear and the second swing arm.

18. The drive apparatus of an ink jet printer according to claim 16, further comprising a seventh gear engaged with the rear end gear of the at least one of the third gear trains when the convey roller comes in contact with the pinch roller thereby conveying the sheet of paper to the feed roller.

19. The drive apparatus of an ink jet printer according to claim 18, wherein a friction member is disposed on a side of the seventh gear.

20. The drive apparatus of an ink jet printer according to claim 11, wherein at least one of the third gear trains comprises:

- a plurality of supporting arms rotatably supporting both ends of a convey roller shaft of the convey roller;

- an extension shaft connecting the plurality of supporting arms;

- a front end gear rotatably assembled at one end of the extension shaft and engaged with the rear end gear of the second gear train; and

- a rear end gear integrally assembled on the convey roller shaft to rotate together.

21. A drive apparatus of an ink jet printer in which a driving power is supplied such that a sheet of paper, stacked in a paper feed cassette, is picked up by a pickup roller, conveyed by a convey roller and a pinch roller, and then printed by a printer head while being line-fed by a feed roller on a feed roller shaft, comprising:

- a first gear train, including a rear end gear, driven to rotate around the feed roller shaft in first and second directions;

- a second gear train, including a rear end gear, on a frame of the ink jet printer to contact the first gear train and to transmit the driving power;

- a third gear train, including a front end gear, connected with the rear end gear of the second gear train and a rear end gear coaxially disposed on a convey roller shaft, driven to rotate around a front end gear shaft in the first and second directions; and

- a control unit controlling the rotation direction of the first gear train to cause the first gear train to separate from the second gear train, thereby blocking transmission of the driving power to the second gear train.

22. The drive apparatus of an ink jet printer according to claim 21, wherein the first gear train comprises:

- a first swing arm with one end rotatably assembled on the feed roller shaft and another end provided with a protruding second gear shaft;

- a first gear integrally assembled on the feed roller shaft to rotate with the feed roller shaft; and

- a second gear engaged with the first gear and rotatably assembled on the second gear shaft.

23. The drive apparatus of an ink jet printer according to claim 22, wherein a friction member is disposed between a side of the second gear and the first swing arm.

24. The drive apparatus of an ink jet printer according to claim 23, wherein the friction member uses a compression spring or a curve spring.

25. The drive apparatus of an ink jet printer according to claim 21, further comprising a third gear shaft wherein the second gear train comprises:

- a third gear rotatably assembled on the third gear shaft to protrude on the frame and to engage with the rear end gear of the first gear train; and

- a fourth gear disposed to rotate in engagement with the third gear.

26. The drive apparatus of an ink jet printer according to claim 21, further comprising a convey roller shaft having the convey roller assembled thereto and a fifth gear shaft, wherein the third gear train comprises:

- a second swing arm, having one end rotatably assembled on the convey roller shaft and the other end provided with a protruding fifth gear shaft;

- a sixth gear integrally assembled on the convey roller shaft to rotate; and

- a fifth gear assembled to rotate on the fifth gear shaft to be engaged with the sixth gear, and to receive a rotation force from the rear end gear of the second gear train.

27. The drive apparatus of an ink jet printer according to claim 26, wherein a friction member is disposed between a side of the sixth gear and the second swing arm.

28. The drive apparatus of an ink jet printer according to claim 26, further comprising a seventh gear engaged with the rear end gear of the third gear train when the convey roller comes in contact with the pinch roller thereby conveying the sheet of paper to the feed roller.

29. The drive apparatus of an ink jet printer according to claim 28, wherein a friction member is disposed on a side of the seventh gear.

30. The drive apparatus of an ink jet printer according to claim 21, further comprising a convey roller shaft having the convey roller attached thereto, wherein the third gear train comprises:

- a plurality of supporting arms rotatably supporting both ends of the convey roller shaft;
- an extension shaft connecting the plurality of supporting arms; and
- a front end gear rotatably assembled at one end of the extension shaft and engaged with the rear end gear of the second gear train, wherein the rear end gear is integrally assembled on the convey roller shaft to rotate the convey roller shaft.

31. A method of alternatively distributing power to pickup and convey rollers and a feed roller in a drive apparatus, including a motor, of an ink jet printer, the method comprising:

- controlling the motor rotation to transmit a first rotation force to the pickup and convey rollers, in accordance with a first command;

- reversing the motor rotation to transmit a second rotation force to the feed roller such that the first rotation force is no longer transferred to the pickup and convey rollers, at a predetermined time;

- operating the feed roller; and

- determining whether a second command has issued, when the operating of the feed roller ends.

32. The method according to claim 31, wherein the operating comprises line-feeding a sheet of paper through the feed roller.